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HUMAN CALCIUM KINETICS STUDIED WITH ^{41}CA DETECTED BY ACCELERATOR MASS SPECTROMETRY. Stewart P.H.T. Freeman[1], Janet C. King[2], Leslie R. Woodhouse[2], Nancy E. Vieira[3] and Alfred L. Yergey[3], [1]Lawrence Livermore Natl Lab, Livermore, CA 94551, [2]Dept Nutr Sci, UCB, Berkeley, CA 94720, [3]NICHD, Bethesda, MD 20892

The use of ^{41}Ca is particularly attractive as a tracer for human calcium metabolism because it is long lived ($t_{1/2} = 10^5$ yr), decays with the release of soft x rays, so rare (natural Ca is only 10^{-15} ^{41}Ca) and readily available (produced by neutron activation of ^{40}Ca). ^{41}Ca can be employed as a tracer when the other isotopes are precluded for physiological, radiological or economic reasons. A mass spectrometer based on a particle accelerator is necessary for the detection of ^{41}Ca at low-levels in order to obtain the necessary sensitivity and resolution from ^{41}K and other molecular interferences. We present preliminary data demonstrating the feasibility of measurements of bone resorption with a two week continuous tracer feeding protocol. (This work was performed under the auspices of the Department of Energy at the Lawrence Livermore National Laboratory under contract W-7405-Eng-48.)